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Job Number: 124-01.39
Job Title: Colbert Landfill
Location: Spokane, Washington

Date: January 17, 1992

To: Mr. Neil Thompson
U.S. EPA
1200 Sixth Avenue
Seattle, WA 98101

We are sending herewith:

Copies	Description
1	Technical Memorandum: Colbert Landfill Remedial Design/Remedial Action Project RE: Results of Additional Well Construction, Hydrogeologic Characterization, and Water Quality Evaluation, dated January 16, 1992.

- [x] For Your Review/Information
- [ ] For Approval
- [ ] Approved as Noted
- [ ] Returned for Corrections as Noted; Please Resubmit
- [ ] For Your File
- [ ] Take Appropriate Action

Remarks:

LANDAU ASSOCIATES, INC.

By: Larry Beard
Lawrence D. Beard, P.E.

LDB/jfs

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TECHNICAL MEMORANDUM

COLBERT LANDFILL REMEDIAL
DESIGN/REMEDIAL ACTION PROJECT

RE: Results of Additional Well Construction, Hydrogeologic Characterization, and Water Quality Evaluation

Date: January 16, 1992

By: Lawrence D. Beard, P.E., and Larry G. Eaton

INTRODUCTION

This technical memorandum presents the results of monitoring well construction, and hydrogeologic and groundwater quality evaluation conducted following completion of Phase I activities for the Colbert Landfill RD/RA Project (Project). Specific activities included:

- Installing two monitoring wells in the Upper Sand/Gravel Aquifer
- Collecting and analyzing groundwater samples from the two new monitoring wells and existing Monitoring Well CD-46C2
- Collecting and evaluating groundwater elevation data in the vicinity of the new monitoring wells.

The two new monitoring wells (CD-34A and CD-35A) were installed to better define contaminant distribution and groundwater flow in the Upper Sand/Gravel Aquifer near the proposed Phase II South Interception System. Groundwater quality and hydrogeologic data collected from these two monitoring wells will augment Phase I Project data during design of the Phase II Remedial Action. Groundwater elevation data were collected to assess whether water elevations for the new Upper Sand/Gravel Aquifer wells are consistent with the hydrogeologic evaluation presented in the Project Phase I Engineering Report.

Monitoring Well CD-46C2 was resampled because of variations in methylene chloride concentration observed for the two rounds of groundwater samples collected during Phase I. The additional data from Well CD-46C2 will also be used during design of the Phase II Treatment System.

WELL CONSTRUCTION

Monitoring Wells CD-34A and CD-35A were installed between September 24 and October 2, 1991, to depths of 110 ft and 103 ft, respectively. The approximate well locations are shown on Figure 1. The two wells were labeled in accordance with the numbering system outlined in the Phase I Engineering Report (Landau Associates 1991). The monitoring wells were constructed in general accordance with the procedures described in the Phase I Groundwater Monitoring Well Construction Plan (Landau Associates 1989a). Soil samples were described in general accordance with the soil classification system described in the Phase I Engineering Report. No construction difficulties were encountered during drilling or installation of the two monitoring wells. The geologic profiles and construction diagrams for the two new monitoring wells are attached.

Health and safety procedures used during boring advancement and well construction were in general accordance with the Project Health and Safety Plan (Landau Associates 1989b). No health and safety problems were encountered.

An elevation survey was conducted by Taylor Engineering, Inc. for the two new monitoring wells and Monitoring Well CD-46C2. Monitoring Well CD-46C2 required resurveying because the casing was extended to accommodate changes in topography associated with the construction of the Colbert Solid Waste Transfer Station. Survey data for the wells are presented below:

Well #	Ground Surface Elevation[(a)]	Top of Steel Casing Elevation	Top of PVC Casing Elevation
CD-34A	1,856.0	1,858.94	1,858.16
CD-35A	1,852.5	1,855.43	1,855.01
CD-46C2	1,849.6	1,853.11	1,852.61

(a) All elevations in feet above mean sea level based on 1929 NGVD.

Groundwater elevation data were collected from monitoring wells and selected domestic wells near the proposed Phase II South Interception System. Contoured groundwater elevation data are shown on Figure 1.

GROUNDWATER SAMPLING AND ANALYSES

Groundwater samples were collected from Monitoring Wells CD-34A, CD-35A, CD-46C2. These samples were collected, handled, and analyzed in accordance with the procedures outlined in the Quality Assurance Project Plan (Landau Associates 1989c). Groundwater quality analyses included volatile organic compounds (EPA Method 8010), alkalinity, total dissolved solids (TDS), total suspended solids (TSS), and turbidity. Conductivity and pH were measured in the field. The groundwater quality data are presented in Table 1.

CONCLUSIONS

The groundwater elevation contours for the Upper Sand/Gravel Aquifer, shown in Figure 1, are similar to those presented in the Phase I Engineering Report (see Phase I Engineering Report Figure ER-4.15). TCA was the only Project Constituent of Concern detected in Monitoring Well CD-34A or CD-35A, and the concentrations are well below the TCA Performance Standard of 200 ppb. Both the hydrogeologic and water quality data are consistent with the characterizations provided in the Phase I Engineering Report.

The concentration of methylene chloride (and the other Constituents of Concern) from the Monitoring Well CD-46C2 sample is similar to those detected in the June 18, 1990 samples collected during Phase I (see Phase I Engineering Report Appendix F, Table F-1, Sample Numbers 154 and 155). Conversely, the methylene chloride concentration for the February 27, 1991 sample from Monitoring Well CD-46C2 is significantly lower than for the other samples (see Phase I Engineering Report Appendix F, Table F-1, Sample Number 262). Thus, the February 27, 1991 methylene chloride data may not be representative and will not be used during Phase II design.

REFERENCES

Landau Associates, Inc. 1989a. Final Phase I Ground Water Monitoring Well Construction Plan, Colbert Landfill Remedial Design/Remedial Action. August 15, 1989.

Landau Associates, Inc. 1989b. Final Health and Safety Plan, Colbert Landfill Remedial Design/Remedial Action. August 7, 1989.

Landau Associates, Inc. 1989c. Quality Assurance Project Plan, Colbert Landfill Remedial Design/Remedial Action. September 28, 1989.

Landau Associates, Inc. 1991. Final Phase I Engineering Report, Colbert Landfill Remedial Design/Remedial Action. December 30, 1991.

TABLE 1
COLBERT LANDFILL RD/RA
SUMMARY OF GROUNDWATER ANALYTICAL RESULTS(a)

			Constituents of Concern													
Well No.	Date Sampled	Sample No.	1,1,1-TCA	1,1-DCE	1,1-DCA	Methylene Chloride	TCE	PCE	Vinyl Chloride	Dichloro-difluoro-methane	Alkalinity Tot. CaCO3 mg/L	Total Dissolved Solids mg/L	Total Suspended Solids mg/L	Turbidity NTU	pH	Conductivity (µS)
CD-34A	09-Oct-91	468	6.3	1.3 U	0.70 U	0.48 UJ	1.2 U	0.30 U	1.8 U	30 U	180	290	2.0 U	0.5 U	7.78	529
CD-35A	09-Oct-91	467	2.1	1.3 U	0.70 U	0.55 UJ	1.2 U	0.30 U	1.8 U	30 U	220	260	2.0 U	0.5 U	8.16	481
CD-46C2	10-Oct-91	469	3100 D	270 D	58	460 D	5.0	0.30 U	2.5	20 J	510	530	2.0 U	0.5 U	7.02	947
CD-46C2 (Dup)	10-Oct-91	470	2500 D	280 D	60	430 D	4.9	0.30 U	2.8	44	NT	NT	NT	NT	NT	NT
Trip Blank	10-Oct-91	FB	0.30 U	0.13 U	0.70 U	0.56 U	1.2 U	0.30 U	1.8 U	30 U	NT	NT	NT	NT	NT	NT

U = Analyte not detected at the detection limit indicated.
D = Sample was diluted prior to analysis.
J = Analyte detected below the detection limit indicated.
NT = Not tested.

(a) All results in parts per billion, except where indicated otherwise. Only detected compounds are presented.
(b) Trichlorofluoromethane.
(c) NT = Not tested.
(d) Data from pilot treatment study used in concentration figures.
(e) – = Not applicable.

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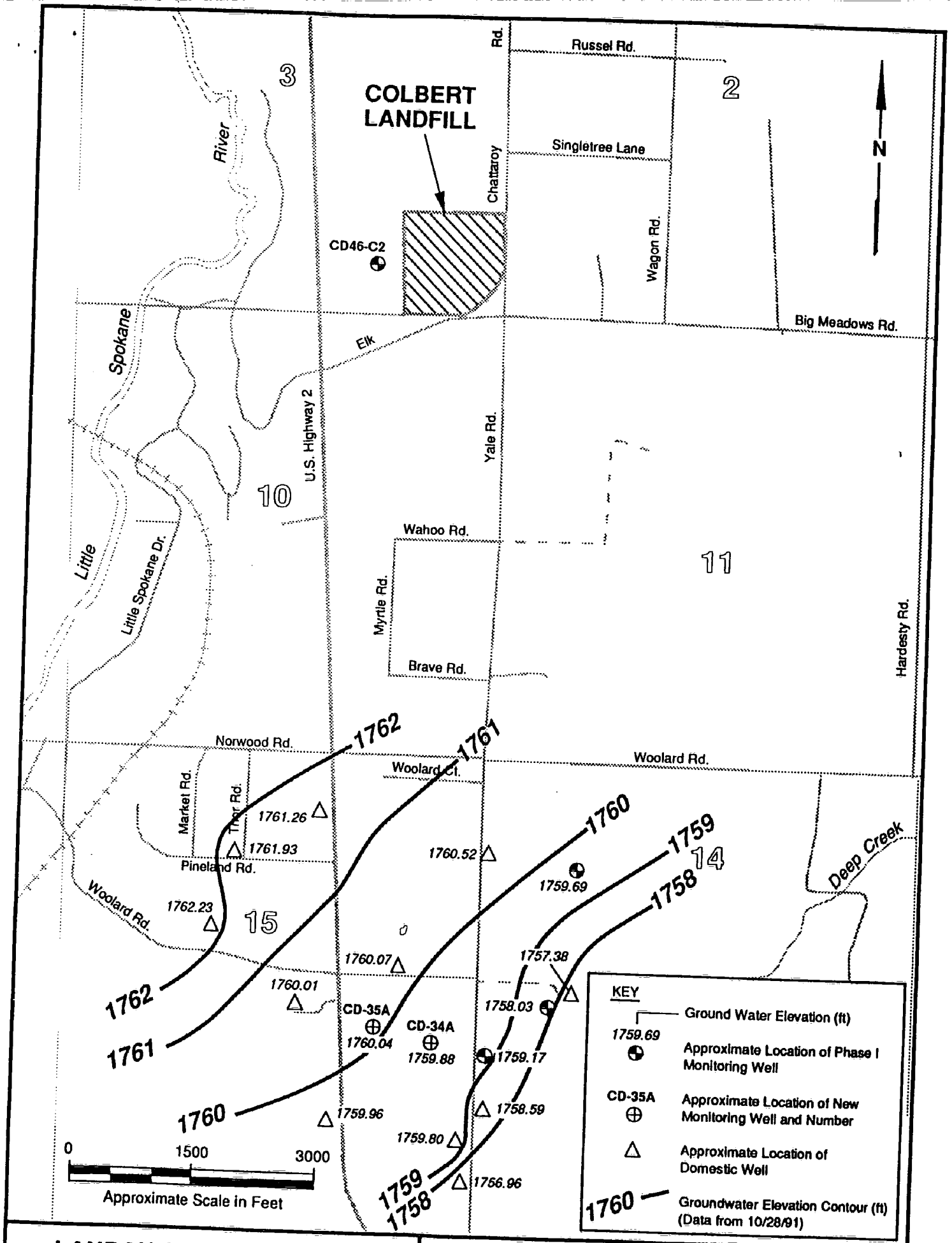

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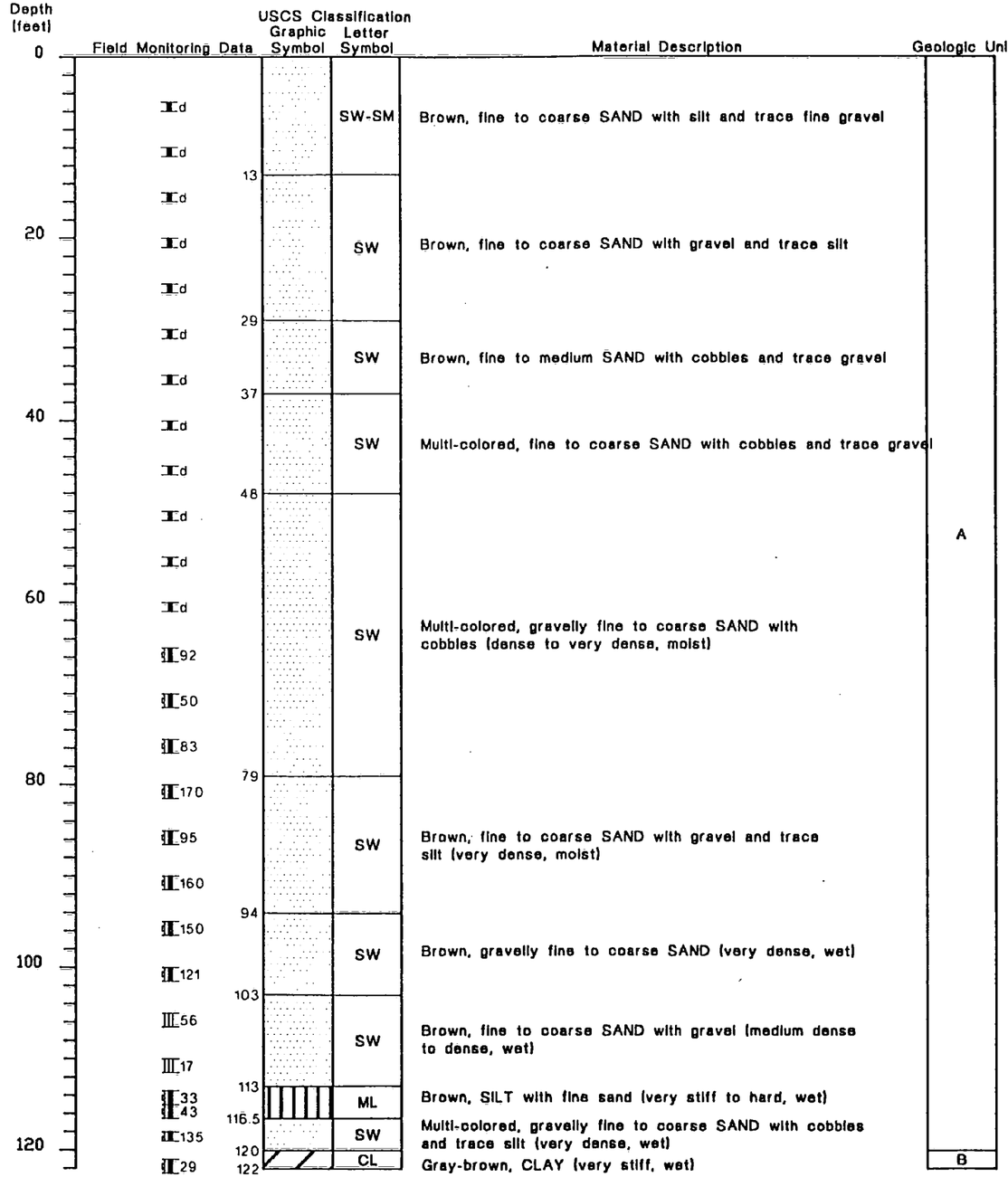
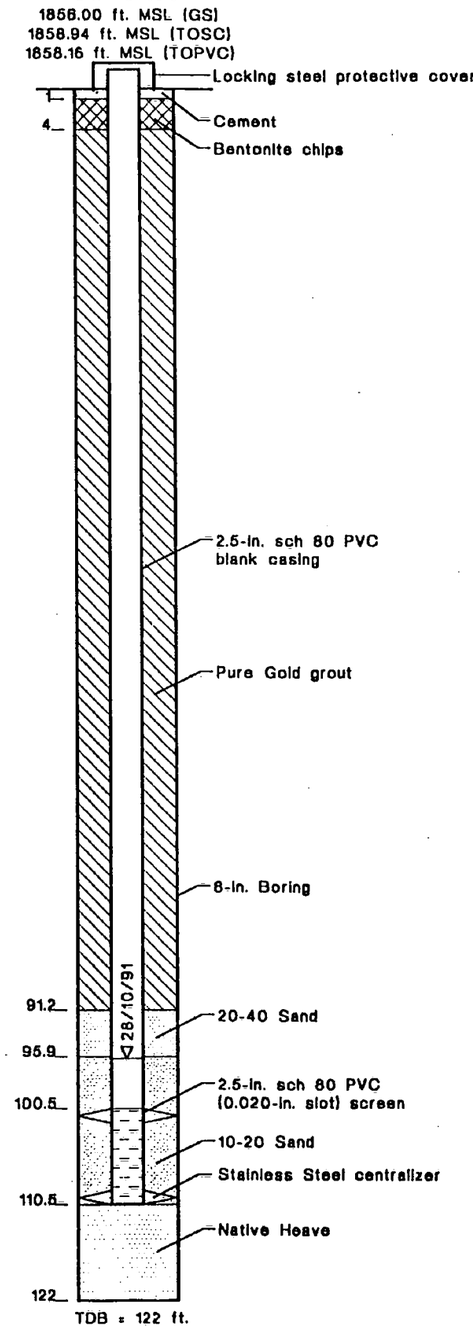
Upper Sand/Gravel Aquifer
Groundwater Elevation Contours

Figure 1

Geologic Profile
Boring CD-34A



Monitoring Well As-Built Diagram
CD-34A



LANDAU ASSOCIATES, INC.	BORING LOG AND WELL COMPLETION DIAGRAM FOR MONITORING WELL CD-34A

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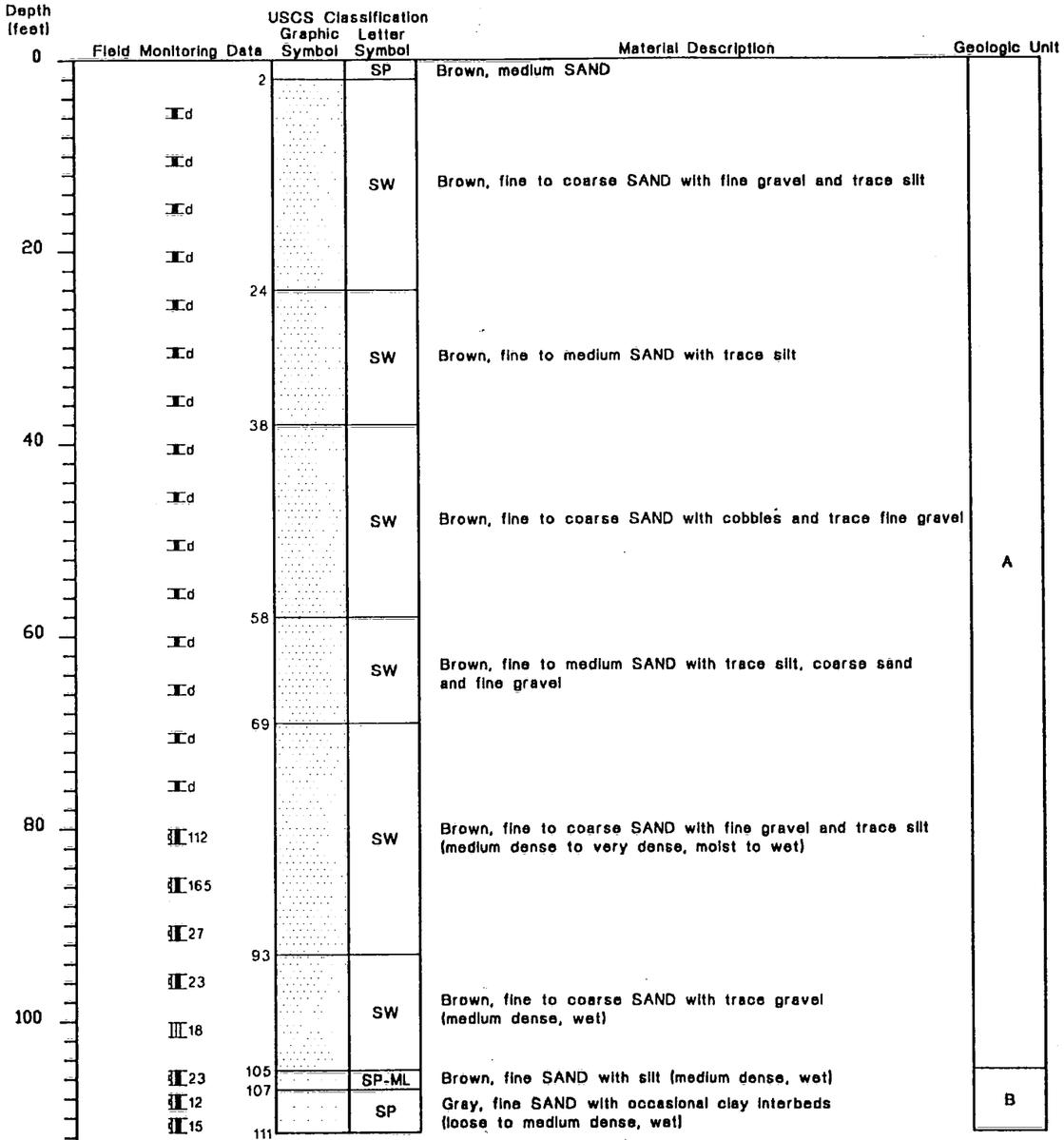
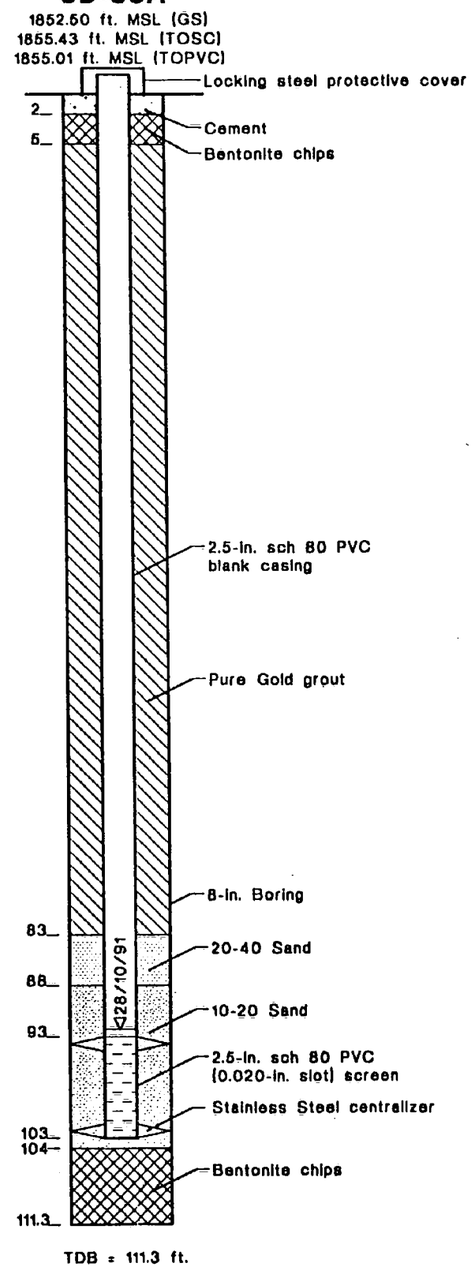
Geologic Profile
Boring CD-35A



Monitoring Well As-Built Diagram
CD-35A



TDB = 111.3 ft.

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LANDAU ASSOCIATES, INC.	BORING LOG AND WELL COMPLETION DIAGRAM FOR MONITORING WELL CD-35A